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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/686,271

10/15/2003

Manoi K. Bhattacharyya

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04/29/2005

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EXAMINER

NGUYEN, VAN THU T

ART UNIT

PAPER NUMBER

2824

DATE MAILED: 04/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------|----------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/686,271 | BHATTACHARYYA ET AL. | |
| | Examiner | Art Unit | |
| | VanThu Nguyen | 2824 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-30 is/are allowed.
- 6) ☒ Claim(s) 1, 4 and 5 is/are rejected.
- 7) ☒ Claim(s) 2-3 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>10/15/2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Claims 1-30 are pending.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: METHOD FOR READING MRAM CELLS USING NEGATIVE MAGNETIC FIELD OR VARIABLE CURRENT.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 4-5** are rejected under 35 U.S.C. 102(b) as being anticipated by Fukami et al. (U.S. Patent No. 5,448,515).

Regarding claim 1, Fukami discloses, in FIGS. 12-15(c), a method for reading the magnetization orientation of a memory cell, the method comprising:

applying a magnetic field to the memory cell (via current I₃);

observing any change in resistance of the memory cell as the magnetic field is applied (via voltage $V \propto \beta$ across points α and β , see FIG. 12; because change in resistance is proportional to change in voltage); and

determining the magnetization orientation based upon the observed change in resistance of the memory cell (i.e. parallel or anti-parallel)

(See column 22, lines 31-54).

Regarding claim 4, Fukami inherently disclose the magnetic field has a magnitude less than a magnitude required to alter the magnetization orientation of the memory cell (because reproduction method is not a destructive reproduction method).

Regarding claim 5, Fukami discloses, in FIG. 15(c), the memory cell comprises a sense layer (b) having an alterable magnetization orientation and a reference layer (a) having a fixed magnetization orientation, and wherein the sense layer is shaped to enhance an edge domain effect of the memory cell.

Allowable Subject Matter

5. Claims 2-3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 6-30 are allowed.

7. The following is a statement of reasons for the indication of allowance:

The prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Fukami, Perner et al., and Sakakima et al., taken individually or in combination, do not teach the claimed invention having the following limitations, in combination with the remaining claimed limitations:

(i) wherein the magnetic field is a negative magnetic field and wherein determining the magnetization orientation includes determining the memory cell is in a parallel magnetization orientation if there is a change in resistance of the memory cell (as in claim 2); or

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(ii) wherein the magnetic field is a negative magnetic field and wherein determining the magnetization orientation includes determining the memory cell is in an anti-parallel magnetization orientation if there is no change in resistance of the memory cell (as in claim 3); or

(iii) a method for reading data from a selected memory cell in an array of memory cells comprising steps of: reversing the first current in the first write line; detecting any change in resistance R of the selected memory cell as the reversed first current is supplied to the first write line; and determining the magnetization orientation of the selected memory cell based on the detected change in resistance R of the selected memory cell as the first current and the reversed first current are supplied to the first write line as in claim 6); or

(iv) a method for detecting the magnetization orientation of a memory cell comprising steps of: replacing the second magnetic field with a third magnetic field; and observing changes in the resistance of the memory cell under the influence of the first and third magnetic fields (as in claim 13); or

(v) a system for reading the magnetization orientation of a memory cell comprising: a current source for applying a variable current to the first conductor and a corresponding variable magnetic field to the memory cell (as in claims 22 and 28);

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VanThu Nguyen whose telephone number is (571) 272-1881.

The examiner can normally be reached on Monday-Friday, 8:00am-4:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 27, 2005



VanThu Nguyen
Primary Examiner
Art Unit 2824